4/17/18

"The most difficult thing is the decision to act, the rest is merely tenacity."-Emelia Earhart

HW: "Even and Odd Functions" homework section

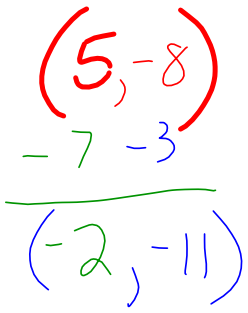
AIM: How do we tell if a function is Even or Odd?

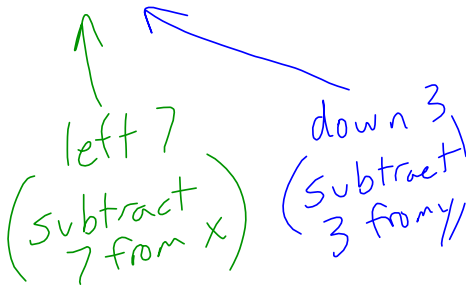
Warm Up:

1. The quadratic function $f(x)$ has a turning point at $(5,-8)$. If $g(x)=f(x+7)-3$, then at which of the following does $g(x)$ have a turning point?

(1) $(-2,-11)$ (3) $(-7,-3)$

(2) $(12,-11)$ (4) $(12,-5)$





Recall that functions are simply rules that convert inputs or X values into outputs or Y.

EVEN AND ODD FUNCTIONS

A function is known as **even** if $f(-x) = f(x)$ for every value of x in the domain of $f(x)$.

A function is known as **odd** if $f(-x) = -f(x)$ every value of x in the domain of $f(x)$.

***Exercise* #1:** Look at the definitions above and try to determine what they say about the inputs and outputs for these types of functions then write down your interpretation on the lines below. Remember that $f(x) = y$.

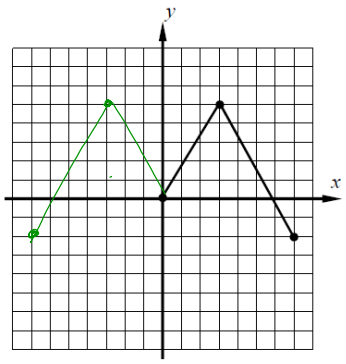
1. Even Functions: If the sign on "x" changes then the y-value stays the same

2. Odd Functions: If the sign on "x" changes then the sign on "y" changes too

Let's take a look at **even** and **odd** functions first from a graphical standpoint.

Exercise #2: Consider the **partial graph** of the function $f(x)$ shown twice below. Sketch the other half of the function if in (a) $f(x)$ is **even** and in (b) $f(x)$ is **odd**. The three coordinate pairs are listed to help you plot.

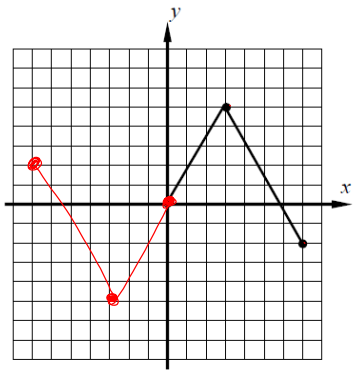
(a) **even**



$(0,0)$, $(3,5)$, $(7,-2)$

$(0,0)$ $(-3,5)$ $(-7,-2)$

(b) **odd**



$(0,0)$, $(3,5)$, $(7,-2)$

$(0,0)$ $(-3,-5)$ $(-7,2)$

(c) Describe the symmetry of the **even** graph and the **odd** graph. Use as technically correct terminology as you can from your studies in Geometry.

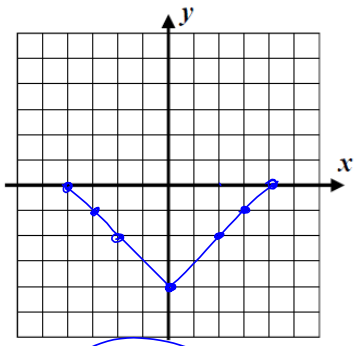
EVEN: reflection over the y-axis

ODD: reflection over the origin $(0,0)$
(Turn your paper upside down)

***Exercise* #3:** Consider the function $f(x) = |x| - 4$.

(a) Evaluate this function for a variety of opposite input pairs. What type (even, odd, or neither) does f appear to be?

(3, -1)
(-3, -1)
(2, -2)
(-2, -2)
(4, 0)
(-4, 0)



Even

(b) Sketch $f(x)$ on the grid below *without* the use of your calculator. Does it have the correct symmetry for your choice in (a)?

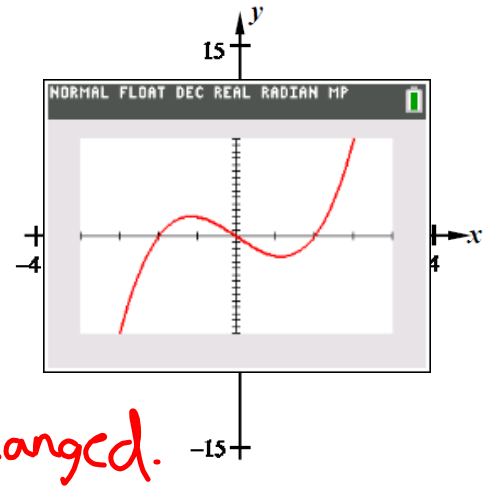
***Exercise* #4:** Let's investigate $g(x) = x^3 - 4x$.

(a) Use your calculator's table option to fill in the following table. What type of function is this. Explain.

x	$g(x)$
−3	−15
−2	0
−1	3
0	0
1	−3
2	0
3	15

odd b/c when we change sign on x the sign on y changed.

(b) Sketch a graph of $g(x)$ using your calculator and the window indicated.



***Exercise* #5:** Is the simple exponential function $f(x) = 2^x$ odd, even, or neither? Support your argument with numerical evidence.

$2^{21} = 2097152$

$2^{-21} = 4.768 \times 10^{-7}$

Neither